



# FIVE *Dangerous* WEEDS



# FIVE DANGEROUS WEEDS

Leafy Spurge, Field Bindweed, Hoary Cresses,  
Russian Knapweed, and Bladder Campion  
comprise a group of deep-rooted persistent  
perennial weeds that are handled in Manitoba,  
through a system of Weed Control Units.



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# DEEP-ROOTED, PERSISTENT PERENNIAL WEEDS AND THEIR CONTROL

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## GENERAL

In Western Canada, within recent years, several deep-rooted and very persistent perennial weeds have added to the problem of weed control. In Manitoba, an organized campaign to control five of these weeds has been under way since 1940. The five weeds brought under this plan are: Leafy Spurge (*Euphorbia Esula*), Field Bindweed (*Convolvulus arvensis*), the Hoary Cresses (*Cardaria Draba* and others), Russian Knapweed (*Centaurea repens*), and Bladder Campion (*Silene Cucubulus*).

The control of deep-rooted persistent perennial weeds is both expensive and difficult. With few exceptions, control is beyond the means of the individual farmer. In areas where any one of these weeds has become established, organized community effort would seem essential to successful control. This was recognized at the time Manitoba organized its control campaign.

In the main, the Manitoba control campaign has centered around one weed, leafy spurge. However, as the other weeds comprising the group of deep-rooted perennials are essentially similar in root development and habit of growth, the same general control principles apply. This publication is intended to assist the public to identify the deep-rooted persistent perennial weeds and to review control methods that have been followed with a degree of success for four years under the Manitoba plan.

## DESCRIPTION OF WEEDS

### LEAFY SPURGE

*Euphorbia Esula*

Leafy Spurge is a very deep-rooted perennial, which may grow from a few inches to two and one-half feet high. It has green, narrow leaves, almost exactly like those of flax, but larger, the leaves on large plants being about two inches long. Plants that have not reached the blooming stage look much like little flax plants. On being pulled,

however, they are found to have deep woody roots. When either leaf or stem is broken a thick, milky sap exudes.



Courtesy of Line Elevators Farm Service

### LEAFY SPURGE

The stems are straight, pale green, and numerous stems may spring from the same root. The above-ground growth springs afresh each season from the perennial roots. The stems are rather hard and woody, and sometimes the dead stems of the year previous are present. Generally this weed grows in rather thick clumps, as it spreads by its root system as well as by seeds.

The yellowish green flowers, which appear any time from May 20th on, are borne well toward the top of the plants, and are carried long enough to give the plant an almost unchanged appearance for some months. The flowers are borne in a rather unusual manner. At the top of the plant there is a sort of umbel or cluster of flower stalks springing from a common point; but there are also lower side branches which bear blooms. The real flowers are small, being only about one-eighth to one-quarter inch across; but just below the flower proper there are some yellowish-green ornamental bracts or leaflets which, in the popular mind, will be considered as part of the flower.

Where the plants have grown undisturbed from spring, the seeds ripen during July. They are oblong, from grey to brown, and about as large as garden radish seeds. They are borne in three-seeded capsules. These capsules have the power to "explode" and throw the seeds a short distance. The ripening continues for some time.

## FIELD BINDWEED

*Convolvulus arvensis*

Field Bindweed is an introduced morning glory.

It has long soft creeping roots that look much like white cotton strings. Some of these roots go very deeply into the soil while others run out laterally slightly below the soil surface and start new plants. Thus a single plant very quickly develops into a whole mat of plants. Above ground growth appears about the end of May.

The fact that there is a widely distributed native morning glory, or bindweed, known as hedge bindweed, complicates the situation. This weed is distinguishable from the introduced sort only on very careful observation, and the desirability of seeking expert identification in case of doubt cannot be over emphasized. Also field bindweed is often confused with wild buckwheat.

A plant of field bindweed may develop from one to thirty stems. These are smooth, soft, trailing and fairly fast growing. They will wind around any support, but if they find none they lie flat on the ground. In length they seldom exceed four feet. The leaves, about one and one-quarter inches long and three-quarters of an inch wide, are variable in shape but are most often bluntly arrow-like.



Drawing by Miss Thelma Emmert.

### FIELD BINDWEED

The funnel-shaped flowers of field bindweed are typical of the morning glory, but they are smaller than other well known species. They vary from a delicate pink to white. The best means of distinguishing between field bindweed and hedge bindweed is by the position of the two small leaflets or bracts which occur on the flower-stalk below the flower. On field bindweed these are very small and are situated one-quarter to one-half inch below the flower. On hedge bindweed they are much larger and grow close to and cover the lower part of the flower.

## HOARY CRESSES

*Cardaria Draba and others*

There are three quite well defined types of Hoary Cress, the differences to be found mainly in the shape of the seed pods. The



Courtesy of Line Elevators Farm Service

### HOARY CRESS

root system of the three plants is similar in its freely branching and creeping perennial character. The roots penetrate deeply and the plants are capable of storing an abundance of food. This characteristic is responsible for the very persistent nature of these weeds.

Plants of the hoary cresses range from ten to eighteen inches in height, and are characterized by the large prominent clusters of small white flowers. The stems are often spreading rather than firmly erect. The leaves are greyish-green in color and covered with fine, soft, short hairs. Stinkweed, the only plant with which the hoary cresses might be confused, is bright green in color with smooth leaves.

The seed of hoary cress is not long-lived in the soil. In a test conducted under irrigated and dry-land conditions in California, no germination occurred in the third or fifth year after burial. The weed spreads slowly where good farming is practised. This is probably due to the fact that the seedlings are easily destroyed and do not become sufficiently well established to withstand thorough cultivations between crops. When seeded with a forage crop incapable of offering strong competition, however, the plant becomes well rooted before the land is re-broken and again cultivated.

The hoary cresses spread by seed and roots.

## RUSSIAN KNAPWEED

*Centaurea repens*

Russian knapweed is a persistent perennial weed, spreading by seed and creeping rootstocks. It is a species of Star Thistle and may be distinguished from most other perennial weeds by its lilac-colored flowers in small round heads.

As the name implies, soft, gray hairs or nap cover the stems, at least of young plants. This nap does not appear on the branches of the flowering stalk. The leaves on mature stems are small, narrow, with smooth surfaces and edges, without a pronounced midrib or stalk. The stems are hard, tough and practically inedible when dried in hay. The perennial roots are tough and dark brown or black in color.

The flowers are borne in small, almost spherical heads, like straw-flower but are only three-eighths to one-half inch in diameter. The flowers somewhat resemble those of Bachelor's Button, but they are smaller. The small heads and the absence of thorns or prickles, distinguish the knapweed from any other member of the thistle family.



Courtesy of  
North Dakota Agricultural College

RUSSIAN KNAPWEED

The seeds are white, about one-eighth of an inch long, approximately twice as long as they are broad and marked with fine longitudinal lines. The seeds are borne in cup-shaped heads that do not open readily at maturity. Seeds are not carried very readily by the wind because they are comparatively heavy and the tufts of hair which they carry is short. The seed is easily collected and spread by harvesting machinery.

## BLADDER CAMPION

*Silene Cucubulus*

Bladder campion is an introduced, deep-rooted, freely branching, perennial weed belonging to the Pink family. It grows from one to two feet high. The leaves are from one-half to one inch wide and tapering to a point. They are smooth and arranged in pairs with their bases meeting around the stem.



Courtesy of Line Elevators Farm Service

### BLADDER CAMPION

The flowers are white and from one-half to three-quarters of an inch in diameter. They are borne in loose clusters which are often drooping. The petals are notched and the calyx is much inflated and bell-shaped, with distinct purplish veins. It is from the inflated calyx that the plant derives its common names, bladder campion, bladder weed, and cow bell. This weed flowers from June to August and matures large quantities of seed.

The seeds are about one-sixteenth of an inch in length, irregularly kidney-shaped, light brown to dark grey in color, the surface covered with regularly arranged rows of tubercles. Typical seeds show a marked depression at the scar. This character, and the more conical shape of the tubercles, makes it possible for a careful observer to distinguish them from the seeds of the night-flowering catchfly and white cockle, which they resemble very closely.

Bladder campion spreads from both root and seed.

## INTRODUCTION AND DISTRIBUTION

**Leafy Spurge**—Although leafy spurge, in Manitoba, was first identified more than twenty years ago, it is now well established that it was introduced, probably from Europe, in seed grain and grasses, many years before the first specimens were sent to the Agricultural College for identification. Its spread was not spectacular or rapid. However, since its introduction to this province it has spread very considerably and has become a real menace on many farms. Over seventy municipalities, from east of the Red River to the Saskatchewan boundary, and from the International boundary as far north as the Riding Mountains, now report leafy spurge. Over this area the infestations show wide variation in number and size. Heaviest concentrations of the plant are to be found in the Carman-Morden-Roland area, and in the neighborhood of Brandon. About forty municipalities have only scattered and light infestations. In the last four years considerable headway has been made in eradicating many of the small and scattered patches of leafy spurge.

**Field Bindweed**—Field bindweed appears to have been introduced at a considerably later date than leafy spurge, and is less widely distributed. The heaviest infestation is met with in the Winkler district. Other small and scattered outbreaks of this weed, many of which have been stamped out in the last few years, originated in gardens and can be traced to the use of impure seed.

**Hoary Cresses**—There are three well defined types of this weed which are met with still less frequently than field bindweed or leafy spurge. For a good many years patches of hoary cresses have been reported from along the Assiniboine Valley in the Brandon area. More recently a few patches have been found at widely scattered points; these, in the main, have been eradicated by the use of chemicals.

**Russian Knapweed**—Less than a half dozen patches of Russian knapweed have been found, mostly in south-western Manitoba. Eradication of these is complete or nearly so.

**Bladder Champion**—This weed is met with on a considerable number of farms in the Ethelbert area. North of Douglas one quarter section of land has been heavily infested with bladder champion for over twenty years. In 1941 a small patch was found on railway property in the town of Emerson.

## CONTROL METHODS

The programme followed in the control of deep-rooted perennial weeds in Manitoba was based upon extensive research and experimental work carried out with field bindweed and leafy spurge in other countries, supplemented by worthwhile findings obtained more recently within the province. During the years 1937 to 1939, officials of the Dominion Experimental Farm, Brandon, conducted a series of experiments to determine appropriate methods of controlling leafy spurge. This was followed by the application of these findings on a considerable number of farms in some seventeen municipalities comprising the Northern Judicial District. The work was commenced in June, 1939, and extended over a two-year period. Three control methods are recognized, as follows:

**The Application of Chemicals**—for small and scattered patches, fence lines, road allowances, etc.

**Intensive Cultivation**—for relatively extensive infestations on land of sufficient worth to merit the considerable financial outlay necessary.

**Discontinue Cultivation**—where extensive infestations are met with on less productive sandy soils.

### MUNICIPAL WEED CONTROL UNITS FORMED

A survey, to determine the occurrence of deep-rooted persistent perennial weeds, was commenced by the Weeds Commission in the early summer of 1940. The organization of all municipalities in which deep-rooted perennials were found was commenced immediately following the survey. The objective was to group several municipalities together as one Weed Control Unit. Boundaries, in the main, followed those already defined as Agricultural Representative areas. When organization was completed by midsummer, 1941, fifteen Units, including some seventy municipalities were in operation.

As had been hoped, several advantages resulted from the Unit plan. The application of chemical was centralized in the hands of a relatively few trained and experienced crews, rather than left to many farmers, weeds inspectors and others. Centralization made it possible and advisable to obtain better equipment. Less time was required to service and supervise a limited number of crews operating through most of the season. Very important too has been the systematic manner in which patches, once taken under treatment, have been "followed up" until eradication has been completed. Weed Control Units to date have concentrated upon the application of chemical.

### Unit Organization

In setting up Municipal Weed Control Units the organization was kept as simple as possible. Each of the several municipalities comprising a Unit named two members from the Municipal Council, to a central committee. Each committee appointed one of its members chairman, and selected a secretary-manager, usually the Agricultural Representative. The weed control programme for the Unit then became the responsibility of the committee. Usually two meetings were held each year, one in the spring and one in the fall. At the spring meeting a crew was engaged to operate the sprayer, the equipment was checked and the spraying circuit arranged. At the fall



Photo by Author

A spray-rig treats a patch of leafy spurge that has worked into the edges of a bush.

meeting reports were received from the spraying crew and general plans drawn up covering the next year's operations. The two representatives for each municipality working with the weeds inspector (or inspectors) planned details of itineraries within the respective municipalities, and were responsible for the general operation of the programme so far as the individual municipalities were concerned. Accounts within a Unit were cleared through one municipal office.

### Units in Operation

The programme followed by Manitoba Units requires that each infested farm be visited by the spray outfit twice in the season, once

in early summer and again early in the fall. While the initial treatment will eradicate some patches and kill the majority of plants in the remaining patches, "follow up" treatments are essential. Where the patch is fairly large it is nearly impossible to avoid missing some plants with the first treatment; also around the borders plants are likely to appear later. The second, and where necessary the third treatment, ensures a complete kill. Even after a patch has apparently been eradicated it should be watched for seedlings or stray shoots.

All Units began operations with hand pumps, but within the last two years a number have installed power pumps. The use of power, while increasing the overhead for equipment, eliminates the need for one man, speeds up operations and ensures a uniform high pressure, with better coverage and more satisfactory results. Units with only limited territory to cover find the hand pump satisfactory and use one hose-line equipped with a four nozzle boom, whereas areas with more extensive infestations use two lines of hose.

### **CONTROL BY CHEMICALS**

The use of chemicals in the eradication of deep-rooted perennial weeds is limited almost entirely, on account of cost, to relatively small and scattered patches of weeds, and to infestations on banks of streams, in and around bluffs, along fence lines where other methods cannot apply, etc. In Manitoba, sodium chlorate in the form of Atlacide has been used throughout the campaign.

Before undertaking the actual treatment, infestations within municipalities were located and mapped. This became the responsibility of the weeds inspector. Various means have been used in order to get farmers and others to report infestations. These include posters, articles in the local papers, announcements at meetings, the placing of weed exhibits in stores, and farm to farm visits.

Each patch, previous to, or at the time of spraying was marked with a stake and given a number. For various reasons the system of marking with stakes has been discontinued and the plan followed at present is to plot the numbered patches on the reverse side of the report form.

### **Details of Treatment**

Leafy spurge is sprayed with a solution of Atlacide and water, mixed at the rate of one and one-quarter to one and one-half pounds of Atlacide to one imperial gallon of water. Care must be taken to avoid the use of alkali water. Depending upon the density and height of weed growth, the initial treatment will require at least a gallon of solution to each one hundred square feet. All plants require to be well wetted to ensure a kill. Larger patches require that the border beyond the edge of growth for a distance of six to ten feet

should be treated to prevent "creeping" of roots. Small patches require somewhat less border coverage. Subsequent treatments will depend upon the "kill" obtained in the initial treatment. Where all but a few weakened shoots of the weed have been eradicated a light spraying will suffice. Where parts of a patch or the borders show considerable growth a heavier application over such plants is necessary.

Even after a patch apparently has had all weed growth eradicated it should be checked for stray plants at least annually, for several

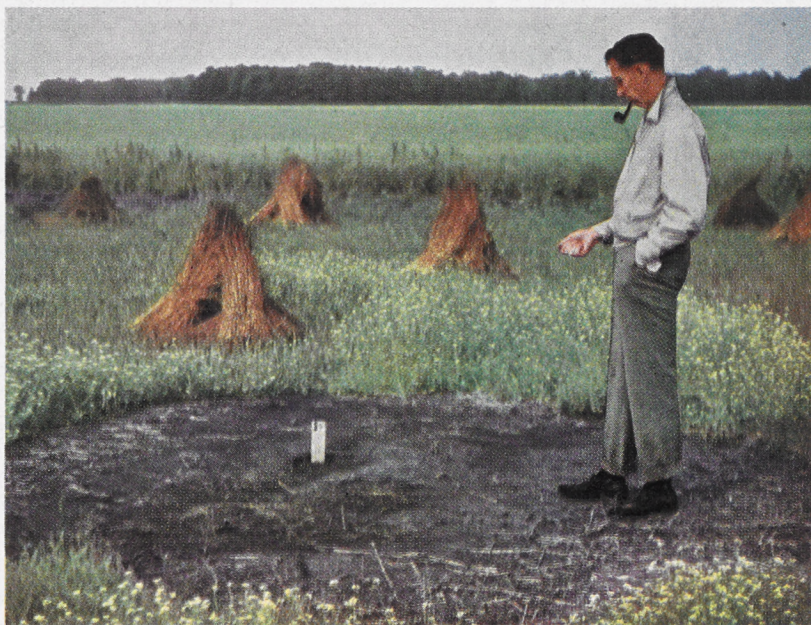


Photo by Author

A large patch of leafy spurge, in a sweet clover field, eradicated by spraying with Atlacide.

years. These may start from seed or from roots not completely killed. Where only the occasional plant is found it can be "spot" treated. This can be done by dusting with the dry Atlacide powder, which should always be kept in a sealed container, or by making a small hole in the ground at the root of the plant, putting in about a tablespoon of dry chemical and covering with the soil removed. Patches in which all plants have not been completely killed will gradually recover. Where treated with chemical the soil remains sterile for at least two years after treatment is completed.

Patches and especially the borders of these are difficult to locate when they occur in growing crops. The moving of cultivation machinery over treated patches is inadvisable. Frequently, in cultivated fields, cultivation is carried on too closely to the patch on which

chemical is being used. In not a few instances, treated patches have been plowed under shortly after treatment. Where this occurs the effectiveness of the chemical is largely lost. When a field to be fallowed has only a limited number of patches, not too large in size, chemical can be used successfully by observing the above. On the other hand, in a spring-seeded field of grain it is seldom advisable to attempt spraying. Patches of leafy spurge, and the other weeds included in the group, are usually more quickly and completely eradicated on sod than on land under cultivation.

### **Precautions in Handling Atlacide**

Atlacide as received in drums is not inflammable. When sprayed on vegetation in solution it absorbs and holds moisture, except under conditions of high temperature and low humidity. However, the following precautions should always be taken: never strike matches on your clothing or smoke when applying Atlacide, or before you have changed your clothes. Clothing which has become wetted with solution should be removed as soon as possible, soaked in water and dried. Never attempt to dry clothing on your body by artificial means. Atlacide spilled on floors, or in wagon boxes, trucks, or other equipment, should be swept up and buried. Wash down all wooden parts of equipment each day after spraying. This will prevent a "build-up" of combustible crystals, which constitute a fire hazard.

Except when consumed in considerable quantity, Atlacide is not harmful to animals. Some animals, especially those not having regular access to salt, may be attracted to freshly treated herbage. If grazed soon after spraying the effectiveness of the chemical on the weeds treated is lessened. It is suggested that pastures treated with Atlacide have stock kept off them for several days. Where this is not possible the animals should have free access to salt previous to and following treatment.

### **Costs**

Over the last several years considerable cost data on treating with chemical have been gathered. Municipalities have assumed the major part of the costs. In addition to arranging the purchase of Atlacide in carload lots, and thereby effecting a saving over purchase in small lots by each municipality, the Manitoba Government has absorbed as its share toward the campaign approximately one-third of the cost. The municipalities have borne the balance, together with the cost of application. This latter item varies greatly over the various Units, but is approximately equivalent to the cost of Atlacide to municipalities. A number of farmers have assumed a portion of the cost of treating patches over the maximum size that the municipality deemed expedient to treat. Within the last year there has been

a noticeable upward trend in the cost of applying the chemical due mainly to increased labor and truck charges.

### **Results with Atlacide**

Where Unit spray foremen have adhered to the programme outlined above, excellent results have been obtained, in Manitoba,



Photo by Author

The weeds inspector points out the essentials in an "intensive cultivation" job.

from the use of Atlacide in treating deep-rooted perennial weeds. As a result of four years' work many thousands of patches of leafy spurge, as well as patches of the other weeds, have been eradicated.

### **CONTROL BY INTENSIVE CULTIVATION**

During the last four years a number of farmers, as well as several municipalities, have demonstrated that extensive infestations of leafy spurge can be controlled by a system of "intensive cultivation." This method of control is recommended only for comparatively good land. If followed on very light soil, the hazard from drifting may be as serious as that from the weed.

Success with intensive cultivation involves three underlying principles: (1) thoroughness of work (2) regularity of operations (3) cultivation carried over at least a two-year period.

## **Thorough Work Essential**

Cultivation is best when started immediately after harvesting the crop or early the next spring. The implements used will depend upon those available and the nature of the soil. They should always be kept in good working condition with the cutting blades sharpened frequently. The duck-foot cultivator, with wide over-lapping shovels, will be found to be the best of the several implements in common use. If too much quack grass is not present, with the weed to be eradicated, it may be advantageous to start operations and continue throughout with the cultivator, commencing with shallow cultivation and gradually working more deeply. Wherever possible, every second operation should be at right angles to the previous one, thereby ensuring a more nearly complete cut-off of all roots. To bring about complete destruction of all plants at each operation it may be necessary to go over portions of the field, where growth is heavy, a second time, or to overlap operations.

## **Cultivate at Regular Intervals**

Regularity of cultivations is most important. Under most field conditions cultivations should be spaced two weeks apart. This allows six to eight days for the plants to emerge, and not over four to six days after emergence. Leaving the plants up to six days after they emerge allows them to draw upon reserves of plant food stored in the roots. If they are left longer the process is reversed and the object of cultivation, namely starvation of the roots, is defeated. Probably towards the end of the first season, and certainly in the second year, as the plants begin to lose their vigor, and emergence begins to lag, cultivations can be spaced at longer intervals—probably three weeks. Plant growth should never be allowed to continue for more than six days from the date of emergence of the first plants.

## **Cultivate at Least Two Years**

Failure to eradicate leafy spurge, even where the work has been thoroughly and regularly done, often results from cultivation being discontinued before the root system is completely starved. Seldom, if ever, can complete eradication be expected when cultivation is not carried over the whole of two seasons.

Such a practice involves considerable expense, however, and may expose a field to the hazard of soil drifting. To meet such situations it may be necessary and advisable to alternate one season of intensive cultivation with one year of crop. A short season crop such as barley, which covers the ground quickly and thoroughly, should be chosen; millet is likewise satisfactory. Previous to seeding, the field should be cultivated. It should also be either harvest-plowed or cultivated behind the binder or immediately after the crop is harvested. Culti-

ventions should continue at regular intervals until freeze-up, start again early the next spring, and continue as for the two-season operation. Such a plan takes care of the soil-drifting hazard and gives approximately the same results as two continuous seasons' operations. An alternative to this plan would be a crop of fall rye seeded about the middle of September. A good stand of rye will protect land subject to soil drifting throughout the winter and early spring. In early May the crop of rye may be sacrificed and the cultivation programme continued, or it may be allowed to mature and the field handled as with barley.



Photo by Author

Crested wheat grass seed was drilled into a heavily infested patch of leafy spurge. The soil is a light loam. After 27 months the leafy spurge has been much weakened. Note leafy spurge in background where no grass was seeded.

### **Intensive Cultivation Expensive**

While control by "intensive cultivation" will be found to be very much less expensive than by the use of chemical, the cost nevertheless will be considerable. Depending upon local conditions, the per acre cost varies so greatly that it is difficult to state an approximate figure. To eradicate leafy spurge on a heavily infested field may reach and even exceed Twenty Dollars an acre. Following such cultivation, however, land will be found to be in excellent condition to produce crops.

## CONTROL WHERE CULTIVATION IS DISCONTINUED

Considerable of the leafy spurge infested land (and this does not apply to the other deep-rooted persistent perennial weeds) is sandy or gravelly soil of low productivity. To attempt to apply a system of intensive cultivation on land of this type, in addition to the financial outlay involved, immediately raises the hazard of soil drifting. No doubt, as research and experimentation with infested lands of this kind proceeds, implements especially designed to maintain a maximum of trash cover will be introduced, whereby it may be possible to rid this type of land of its weed menace.



Photo by Author

Sheep, the only farm animal to eat leafy spurge. These sheep have just been turned into a heavy infestation on light soil. This field should have been mowed as sheep prefer tender growth.

On light sandy soils it may be advisable to treat with chemical infestations larger in area than on more productive land which lends itself more readily to intensive cultivation.

Attention to date has been directed to isolating in as far as possible such properties and applying one or more of the following practices:

- (1) mow to keep from further spread by seed
- (2) pasture with sheep
- (3) seed to crested wheat grass.

### Mow to Prevent Seeding

The hazard of ripe seed spreading to uninfested areas in grain for feed or seed, through hay, on the hoofs of animals, on the wheels of

vehicles, by wind, water, birds, etc., should not be overlooked. Efforts should be made each season to mow all infestations that are not being controlled by other methods. It may be necessary, at intervals, to wash off the cutting blade with water as the milk-like juice of the weed tends to clog the machinery.

### **Sheep as a Means of Control**

Sheep are the only domestic animals as far as is known that will eat leafy spurge. They very soon acquire a taste for the plant to a point where it is preferred to other pasture. Where insufficient sheep



Photo by Author

A 35-acre field of leafy spurge is mowed to prevent seeds forming. This field is to be cultivated under the Post War Programme.

are available to keep the infested area closely cropped, or where they are put into a field after the leafy spurge has attained considerable growth, it is advisable to use the mower at intervals. While sheep may not ever eradicate leafy spurge, they will go far toward bringing it under control. Following several years of close pasturing, it seems reasonable to assume that the weed could be easily eradicated by cultivation.

### **Crested Wheat Grass for Sandy Soils**

On sub-marginal land where it is not possible to pasture with sheep, or where it is desired to increase the carrying capacity of the

land, it is suggested that seeding to crested wheat grass may have possibilities. At Saskatoon the results of a series of experiments demonstrated that where crested wheat grass was seeded into leafy spurge infested plots, most of the weed was gradually crowded out. More recently, in the Melita district, similar results have been obtained. A number of farmers, and several municipalities, have seeded badly infested acreages with crested wheat grass. It is too early to report results. In some areas other grasses and alfalfa may be preferred to crested wheat grass. It is firmly believed that light poor soils infested with leafy spurge are much better taken out of cultivation and treated as suggested above.

## A POST-WAR WEED CONTROL PROGRAMME

A system of intensive cultivation will eradicate deep-rooted persistent perennial weeds. However, with very few exceptions, the owner or operator of an infested farm cannot carry through the rigid programme by himself. Too often the outlay involved on such farms is too great; the machinery and power inadequate; the knowledge required and the will to do lacking. Some operators will make a good start only to find that a rush period, such as the harvesting season, will interfere with the cultivation programme and undo all that has been accomplished.

With this experience as a background, a number of Manitoba municipalities have, under a recently introduced amendment to the "Noxious Weeds Act," taken over weed-infested properties and applied a system of "intensive cultivation." The legislation permits a municipality to have the work done by contract, or to purchase and operate its own equipment. Following eradication, the property can be cropped by the municipality to re-imburse it for outlays involved. As a Post-War measure it is expected that this method of eradication will be extended to apply to all extensive infestations of leafy spurge, and the other persistent perennials, where the operators admit they are unable to handle the problem. To this end a survey has been made of all such infested properties.

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